



# SUBSTITUTE SEQUENCE LISTING

<110> ADNEY, WILLIAM S.  
DING, SHI-YOU  
MCCARTER, SUZANNE  
HIMMEL, MICHAEL E.  
DECKER, STEPHEN R.  
VINZANT, TODD B.

<120> THERMAL TOLERANT EXOGLUCANASE FROM ACIDOTHERMUS  
CELLULOLYTICUS

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<140> 09/917,384

<141> 2001-07-28

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<170> PatentIn Ver. 2.1

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Ser Glu Ala Tyr Ser Phe Trp Leu Trp Leu Glu Ala Thr Tyr Gly Ala  
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<210> 9

<211> 638

<212> PRT

<213> Acidothermus cellulolyticus

<400> 9

Pro Tyr Ile Gln Arg Phe Leu Thr Met Tyr Asn Lys Ile His Asp Pro  
1 5 10 15

Ala Asn Gly Tyr Phe Ser Pro Gln Gly Ile Pro Tyr His Ser Val Glu  
20 25 30

Thr Leu Ile Val Glu Ala Pro Asp Tyr Gly His Glu Thr Thr Ser Glu  
35 40 45

Ala Tyr Ser Phe Trp Leu Trp Leu Glu Ala Thr Tyr Gly Ala Val Thr

50					55					60					
Gly	Asn	Trp	Thr	Pro	Phe	Asn	Asn	Ala	Trp	Thr	Thr	Met	Glu	Thr	Tyr
65					70					75					80
Met	Ile	Pro	Gln	His	Ala	Asp	Gln	Pro	Asn	Asn	Ala	Ser	Tyr	Asn	Pro
				85					90					95	
Asn	Ser	Pro	Ala	Ser	Tyr	Ala	Pro	Glu	Glu	Pro	Leu	Pro	Ser	Met	Tyr
			100					105					110		
Pro	Val	Ala	Ile	Asp	Ser	Ser	Val	Pro	Val	Gly	His	Asp	Pro	Leu	Ala
		115					120					125			
Ala	Glu	Leu	Gln	Ser	Thr	Tyr	Gly	Thr	Pro	Asp	Ile	Tyr	Gly	Met	His
	130					135					140				
Trp	Leu	Ala	Asp	Val	Asp	Asn	Ile	Tyr	Gly	Tyr	Gly	Asp	Ser	Pro	Gly
145					150					155					160
Gly	Gly	Cys	Glu	Leu	Gly	Pro	Ser	Ala	Lys	Gly	Val	Ser	Tyr	Ile	Asn
				165					170					175	
Thr	Phe	Gln	Arg	Gly	Ser	Gln	Glu	Ser	Val	Trp	Glu	Thr	Val	Thr	Gln
			180					185					190		
Pro	Thr	Cys	Asp	Asn	Gly	Lys	Tyr	Gly	Gly	Ala	His	Gly	Tyr	Val	Asp
		195					200					205			
Leu	Phe	Ile	Gln	Gly	Ser	Thr	Pro	Pro	Gln	Trp	Lys	Tyr	Thr	Asp	Ala
	210					215					220				
Pro	Asp	Ala	Asp	Ala	Arg	Ala	Val	Gln	Ala	Ala	Tyr	Trp	Ala	Tyr	Thr
225					230					235					240
Trp	Ala	Ser	Ala	Gln	Gly	Lys	Ala	Ser	Ala	Ile	Ala	Pro	Thr	Ile	Ala
				245					250					255	
Lys	Ala	Ser	Gln	Thr	Gly	Asp	Tyr	Leu	Arg	Tyr	Ser	Leu	Phe	Asp	Lys
			260					265					270		
Tyr	Phe	Lys	Gln	Val	Gly	Asn	Cys	Tyr	Pro	Ala	Ser	Ser	Cys	Pro	Gly
		275					280					285			
Ala	Thr	Gly	Arg	Gln	Ser	Glu	Thr	Tyr	Leu	Ile	Gly	Trp	Tyr	Tyr	Ala
	290					295					300				
Trp	Gly	Gly	Ser	Ser	Gln	Gly	Trp	Ala	Trp	Arg	Ile	Gly	Asp	Gly	Ala
305					310					315					320
Ala	His	Phe	Gly	Tyr	Gln	Asn	Pro	Leu	Ala	Ala	Trp	Ala	Met	Ser	Asn
				325					330					335	
Val	Thr	Pro	Leu	Ile	Pro	Leu	Ser	Pro	Thr	Ala	Lys	Ser	Asp	Trp	Ala
			340					345					350		
Ala	Ser	Leu	Gln	Arg	Gln	Leu	Glu	Phe	Tyr	Gln	Trp	Leu	Gln	Ser	Ala

355					360					365						
Glu	Gly	Ala	Ile	Ala	Gly	Gly	Ala	Thr	Asn	Ser	Trp	Asn	Gly	Asn	Tyr	
370					375					380						
Gly	Thr	Pro	Pro	Ala	Gly	Asp	Ser	Thr	Phe	Tyr	Gly	Met	Ala	Tyr	Asp	
385					390					395					400	
Trp	Glu	Pro	Val	Tyr	His	Asp	Pro	Pro	Ser	Asn	Asn	Trp	Phe	Gly	Phe	
					405					410					415	
Gln	Ala	Trp	Ser	Met	Glu	Arg	Val	Ala	Glu	Tyr	Tyr	Tyr	Val	Thr	Gly	
					420					425					430	
Asp	Pro	Lys	Ala	Lys	Ala	Leu	Leu	Asp	Lys	Trp	Val	Ala	Trp	Val	Lys	
					435					440					445	
Pro	Asn	Val	Thr	Thr	Gly	Ala	Ser	Trp	Ser	Ile	Pro	Ser	Asn	Leu	Ser	
					450					455					460	
Trp	Ser	Gly	Gln	Pro	Asp	Thr	Trp	Asn	Pro	Ser	Asn	Pro	Gly	Thr	Asn	
465					470					475					480	
Ala	Asn	Leu	His	Val	Thr	Ile	Thr	Ser	Ser	Gly	Gln	Asp	Val	Gly	Val	
					485					490					495	
Ala	Ala	Ala	Leu	Ala	Lys	Thr	Leu	Glu	Tyr	Tyr	Ala	Ala	Lys	Ser	Gly	
					500					505					510	
Asp	Thr	Ala	Ser	Arg	Asp	Leu	Ala	Lys	Gly	Leu	Leu	Asp	Ser	Met	Trp	
					515					520					525	
Asn	Asn	Asp	Gln	Asp	Ser	Leu	Gly	Val	Ser	Thr	Pro	Glu	Thr	Arg	Thr	
530					535					540						
Asp	Tyr	Ser	Arg	Phe	Thr	Gln	Val	Tyr	Asp	Pro	Thr	Thr	Gly	Asp	Gly	
545					550					555					560	
Leu	Tyr	Ile	Pro	Ser	Gly	Trp	Thr	Gly	Thr	Met	Pro	Asn	Gly	Asp	Gln	
					565					570					575	
Ile	Lys	Pro	Gly	Ala	Thr	Phe	Leu	Ser	Ile	Arg	Ser	Trp	Tyr	Thr	Lys	
580					585					590						
Asp	Pro	Gln	Trp	Ser	Lys	Val	Gln	Ala	Tyr	Leu	Asn	Gly	Gly	Pro	Ala	
595					600					605						
Pro	Thr	Phe	Asn	Tyr	His	Arg	Phe	Trp	Ala	Glu	Ser	Asp	Phe	Ala	Met	
610					615					620						
Ala	Asn	Ala	Asp	Phe	Gly	Met	Leu	Phe	Pro	Ser	Gly	Ser	Pro			
625					630					635						

<210> 10

<211> 640

<212> PRT

<213> Cellulomonas fimi

<400> 10

Glu Tyr Ala Gln Arg Phe Leu Ala Gln Tyr Asp Lys Ile Lys Asp Pro  
1 5 10 15

Ala Asn Gly Tyr Phe Ser Ala Gln Gly Ile Pro Tyr His Ala Val Glu  
20 25 30

Thr Leu Met Val Glu Ala Pro Asp Tyr Gly His Glu Thr Thr Ser Glu  
35 40 45

Ala Tyr Ser Tyr Trp Leu Trp Leu Glu Ala Leu Tyr Gly Gln Val Thr  
50 55 60

Gln Asp Trp Ala Pro Leu Asn His Ala Trp Asp Thr Met Glu Lys Tyr  
65 70 75 80

Met Ile Pro Gln Ser Val Asp Gln Pro Thr Asn Ser Phe Tyr Asn Pro  
85 90 95

Asn Ser Pro Ala Thr Tyr Ala Pro Glu Phe Asn His Pro Ser Ser Tyr  
100 105 110

Pro Ser Gln Leu Asn Ser Gly Ile Ser Gly Gly Thr Asp Pro Ile Gly  
115 120 125

Ala Glu Leu Lys Ala Thr Tyr Gly Asn Ala Asp Val Tyr Gln Met His  
130 135 140

Trp Leu Ala Asp Val Asp Asn Ile Tyr Gly Phe Gly Ala Thr Pro Gly  
145 150 155 160

Ala Gly Cys Thr Leu Gly Pro Thr Ala Thr Gly Thr Ser Phe Ile Asn  
165 170 175

Thr Phe Gln Arg Gly Pro Gln Glu Ser Val Trp Glu Thr Val Pro Gln  
180 185 190

Pro Ser Cys Glu Glu Phe Lys Tyr Gly Gly Lys Asn Gly Tyr Leu Asp  
195 200 205

Leu Phe Thr Lys Asp Ala Ser Tyr Ala Lys Gln Trp Lys Tyr Thr Ser  
210 215 220

Ala Ser Asp Ala Asp Ala Arg Ala Val Glu Ala Val Tyr Trp Ala Asn  
225 230 235 240

Gln Trp Ala Thr Glu Gln Gly Lys Ala Ala Asp Val Ala Ala Thr Val  
245 250 255

Ala Lys Ala Ala Lys Met Gly Asp Tyr Leu Arg Tyr Thr Leu Phe Asp  
260 265 270

Lys Tyr Phe Lys Lys Ile Gly Cys Thr Ser Pro Thr Cys Ala Ala Gly  
275 280 285

Gln Gly Arg Glu Ala Ala His Tyr Leu Leu Ser Trp Tyr Met Ala Trp  
 290 295 300

Gly Gly Ala Thr Asp Thr Ser Ser Gly Trp Ala Trp Arg Ile Gly Ser  
 305 310 315 320

Ser His Ala His Phe Gly Tyr Gln Asn Pro Leu Ala Ala Trp Ala Leu  
 325 330 335

Ser Thr Asp Pro Lys Leu Thr Pro Lys Ser Pro Thr Ala Lys Ala Asp  
 340 345 350

Trp Ala Ala Ser Met Gln Arg Gln Leu Glu Phe Tyr Thr Trp Leu Gln  
 355 360 365

Ala Ser Asn Gly Gly Ile Ala Gly Gly Ala Thr Asn Ser Trp Asp Gly  
 370 375 380

Ala Tyr Ala Gln Pro Pro Ala Gly Thr Pro Thr Phe Tyr Gly Met Gly  
 385 390 395 400

Tyr Thr Glu Ala Pro Val Tyr Val Asp Pro Pro Ser Asn Arg Trp Phe  
 405 410 415

Gly Met Gln Ala Trp Gly Val Gln Arg Val Ala Glu Leu Tyr Tyr Ala  
 420 425 430

Ser Gly Asn Ala Gln Ala Lys Lys Ile Leu Asp Lys Trp Val Pro Trp  
 435 440 445

Val Val Ala Asn Ile Ser Thr Asp Gly Ala Ser Trp Lys Val Pro Ser  
 450 455 460

Glu Leu Lys Trp Thr Gly Lys Pro Asp Thr Trp Asn Ala Ala Ala Pro  
 465 470 475 480

Thr Gly Asn Pro Gly Leu Thr Val Glu Val Thr Ser Tyr Gly Gln Asp  
 485 490 495

Val Gly Val Ala Ala Asp Thr Ala Arg Ala Leu Leu Phe Tyr Ala Ala  
 500 505 510

Lys Ser Gly Asp Thr Ala Ser Arg Asp Lys Ala Lys Ala Leu Leu Asp  
 515 520 525

Ala Ile Trp Ala Asn Asn Gln Asp Pro Leu Gly Val Ser Ala Val Glu  
 530 535 540

Thr Arg Gly Asp Tyr Lys Arg Phe Asp Asp Thr Tyr Val Ala Asn Gly  
 545 550 555 560

Asp Gly Ile Tyr Ile Pro Ser Gly Trp Thr Gly Thr Met Pro Asn Gly  
 565 570 575

Asp Val Ile Lys Pro Gly Val Ser Phe Leu Asp Ile Arg Ser Phe Tyr  
 580 585 590

Lys Lys Asp Pro Asn Trp Ser Lys Val Gln Thr Phe Leu Asp Gly Gly  
595 600 605

Ala Glu Pro Gln Phe Arg Tyr His Arg Phe Trp Ala Gln Thr Ala Val  
610 615 620

Ala Gly Ala Leu Ala Asp Tyr Ala Arg Leu Phe Asp Asp Gly Thr Thr  
625 630 635 640

<210> 11

<211> 642

<212> PRT

<213> Thermobifida fusca

<400> 11

Ser Tyr Asp Gln Ala Phe Leu Glu Gln Tyr Glu Lys Ile Lys Asp Pro  
1 5 10 15

Ala Ser Gly Tyr Phe Arg Glu Phe Asn Gly Leu Leu Val Pro Tyr His  
20 25 30

Ser Val Glu Thr Met Ile Val Glu Ala Pro Asp His Gly His Gln Thr  
35 40 45

Thr Ser Glu Ala Phe Ser Tyr Tyr Leu Trp Leu Glu Ala Tyr Tyr Gly  
50 55 60

Arg Val Thr Gly Asp Trp Lys Pro Leu His Asp Ala Trp Glu Ser Met  
65 70 75 80

Glu Thr Phe Ile Ile Pro Gly Thr Lys Asp Gln Pro Thr Asn Ser Ala  
85 90 95

Tyr Asn Pro Asn Ser Pro Ala Thr Tyr Ile Pro Glu Gln Pro Asn Ala  
100 105 110

Asp Gly Tyr Pro Ser Pro Leu Met Asn Asn Val Pro Val Gly Gln Asp  
115 120 125

Pro Leu Ala Gln Glu Leu Ser Ser Thr Tyr Gly Thr Asn Glu Ile Tyr  
130 135 140

Gly Met His Trp Leu Leu Asp Val Asp Asn Val Tyr Gly Phe Gly Phe  
145 150 155 160

Cys Gly Asp Gly Thr Asp Asp Ala Pro Ala Tyr Ile Asn Thr Tyr Gln  
165 170 175

Arg Gly Ala Arg Glu Ser Val Trp Glu Thr Ile Pro His Pro Ser Cys  
180 185 190

Asp Asp Phe Thr His Gly Gly Pro Asn Gly Tyr Leu Asp Leu Phe Thr  
195 200 205

Asp Asp Gln Asn Tyr Ala Lys Gln Trp Arg Tyr Thr Asn Ala Pro Asp  
210 215 220

Ala	Asp	Ala	Arg	Ala	Val	Gln	Val	Met	Phe	Trp	Ala	His	Glu	Trp	Ala	225	230	235	240
Lys	Glu	Gln	Gly	Lys	Glu	Asn	Glu	Ile	Ala	Gly	Leu	Met	Asp	Lys	Ala	245	250	255	
Ser	Lys	Met	Gly	Asp	Tyr	Leu	Arg	Tyr	Ala	Met	Phe	Asp	Lys	Tyr	Phe	260	265	270	
Lys	Lys	Ile	Gly	Asn	Cys	Val	Gly	Ala	Thr	Ser	Cys	Pro	Gly	Gly	Gln	275	280	285	
Gly	Lys	Asp	Ser	Ala	His	Tyr	Leu	Leu	Ser	Trp	Tyr	Tyr	Ser	Trp	Gly	290	295	300	
Gly	Ser	Leu	Asp	Thr	Ser	Ser	Ala	Trp	Ala	Trp	Arg	Ile	Gly	Ser	Ser	305	310	315	320
Ser	Ser	His	Gln	Gly	Tyr	Gln	Asn	Val	Leu	Ala	Ala	Tyr	Ala	Leu	Ser	325	330	335	
Gln	Val	Pro	Glu	Leu	Gln	Pro	Asp	Ser	Pro	Thr	Gly	Val	Gln	Asp	Trp	340	345	350	
Ala	Thr	Ser	Phe	Asp	Arg	Gln	Leu	Glu	Phe	Leu	Gln	Trp	Leu	Gln	Ser	355	360	365	
Ala	Glu	Gly	Gly	Ile	Ala	Gly	Gly	Ala	Thr	Asn	Ser	Trp	Lys	Gly	Ser	370	375	380	
Tyr	Asp	Thr	Pro	Pro	Thr	Gly	Leu	Ser	Gln	Phe	Tyr	Gly	Met	Tyr	Tyr	385	390	395	400
Asp	Trp	Gln	Pro	Val	Trp	Asn	Asp	Pro	Pro	Ser	Asn	Asn	Trp	Phe	Gly	405	410	415	
Phe	Gln	Val	Trp	Asn	Met	Glu	Arg	Val	Ala	Gln	Leu	Tyr	Tyr	Val	Thr	420	425	430	
Gly	Asp	Ala	Arg	Ala	Glu	Ala	Ile	Leu	Asp	Lys	Trp	Val	Pro	Trp	Ala	435	440	445	
Ile	Gln	His	Thr	Asp	Val	Asp	Ala	Asp	Asn	Gly	Gly	Gln	Asn	Phe	Gln	450	455	460	
Val	Pro	Ser	Asp	Leu	Glu	Trp	Ser	Gly	Gln	Pro	Asp	Thr	Trp	Thr	Gly	465	470	475	480
Thr	Tyr	Thr	Gly	Asn	Pro	Asn	Leu	His	Val	Gln	Val	Val	Ser	Tyr	Ser	485	490	495	
Gln	Asp	Val	Gly	Val	Thr	Ala	Ala	Leu	Ala	Lys	Thr	Leu	Met	Tyr	Tyr	500	505	510	
Ala	Lys	Arg	Ser	Gly	Asp	Thr	Thr	Ala	Leu	Ala	Thr	Ala	Glu	Gly	Leu	515	520	525	



Leu Asp Ala Leu Leu Ala His Arg Asp Ser Ile Gly Ile Ala Thr Pro  
530 535 540

Glu Gln Pro Ser Trp Asp Arg Leu Asp Asp Pro Trp Asp Gly Ser Glu  
545 550 555 560

Gly Leu Tyr Val Pro Pro Gly Trp Ser Gly Thr Met Pro Asn Gly Asp  
565 570 575

Arg Ile Glu Pro Gly Ala Thr Phe Leu Ser Ile Arg Ser Phe Tyr Lys  
580 585 590

Asn Asp Pro Leu Trp Pro Gln Val Glu Ala His Leu Asn Asp Pro Gln  
595 600 605

Asn Val Pro Ala Pro Ile Val Glu Arg His Arg Phe Trp Ala Gln Val  
610 615 620

Glu Ile Ala Thr Ala Phe Ala Ala His Asp Glu Leu Phe Gly Ala Gly  
625 630 635 640

Ala Pro